

Typifications in *Cordia* (Cordiaceae), with an assessment of the status of *Cordia blanchetii*

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Summary. Typifications are proposed to facilitate ongoing studies in Cordiaceae and to maintain current usage. Lectotypes are designated for the following 13 names: *Cordia ecalyculata*, *C. digyna*, *C. diospyrifolia*, *C. exaltata* var. *melanoneura*, *C. magnoliifolia*, *C. obscura* var. *tomentosa*, *C. obscura* var. *magnifolia*, *C. salicifolia*, *C. sellowiana*, *C. silvestris*, *C. ulei*, *C. ucayaliensis*, and *Patagonula glaziovii*. Two new synonyms are proposed: *C. crenatifolia* Rizzini to *C. glazioviana* (Taub.) Gottschling & J. S. Mill. and *C. araripensis* Rizzini to *C. bicolor* A. DC. Additionally, nomenclatural notes on *C. blanchetii* are provided.

Key Words. Brazil, lectotype, neotype, nomenclatural synonyms, *Patagonula*, synonym.

Introduction

Cordia L. is the largest genus of Cordiaceae, with about 250 species, and its distribution is pantropical (Miller 2001; Gottschling & Miller 2006). In Brazil, approximately 45 species occur, most concentrated in evergreen lowland and seasonally dry tropical forest (Stapf *et al.* 2010). *Cordia* is characterised by its style with four stigmatic lobes, undivided endocarp, plicate cotyledons, and pollen grains 3-colporate or 3-colpate with the tectum striate to striate-reticulate or spinulose. Recent phylogenetic studies (Gottschling *et al.* 2005) supported the monophyly of the genus *Cordia*. Despite the availability of relatively recent taxonomic treatments for some Brazilian species, many names are still in need of typification. This paper presents nomenclatural updates and taxonomic notes for the appropriate taxa, according to ICBN rules (McNeill *et al.* 2006). This work was carried out as part of the PhD studies of Brazilian *Cordia* species by the first author. Protologues were examined and original collections were studied in the following herbaria: B, BM, BR, C, G, G-DC, HAL, HUEFS, GH, K, M, NY, P, P-LA, PEUFR, OXF, R, RB, US and W (acronyms according to Thiers 2008+).

Cordia bicolor A. DC. (Candolle 1845: 485). *Lithocardium bicolor* (A. DC.) Kuntze (1891: 976). *Gerascanthus bicolor* (A. DC.) Borhidi *et al.* (1988: 399). Type: Suriname, without locality, Hostmann 406 (lectotype G-DC!, selected by Miller (1988); isolectotypes BM!, G!, K!, M!, NY!, OXF!, P!).

Cordia trichostyla Pittier (1917: 252). Type: Guatemala, Alta Verapaz, 550 m, 30 April 1905, Pittier 189 (holotype US!).

Cordia carnosa Rusby (1920: 104). Type: Venezuela, lower Orinoco, 1896, Rusby & Squires 418 (holotype NY!; isotypes GH!, K!, M!).

Cordia belizensis Lundell (1943: 488). Type: Belize, Toledo, 5 July 1942, Gentle 4045 (holotype MICH n.v.; isotype NY!).

Cordia araripensis Rizzini (1976: 180), **synon. nov.** Type: Brazil, Ceará, Crato, Floresta Nacional Chapada do Araripe, 29 Oct. 1965, Sobrinho 138 (holotype RB!; isotype PEUFR!).

DISTRIBUTION. Southern Mexico, Central America to northern South America in Colombia, Venezuela, Peru, Guyana, French Guiana, Suriname, Brazil, and Bolivia.

NOTES. Rizzini (1976) described Sobrinho 138, collected in the ‘Serra do Araripe’, Ceará, as a new species, *Cordia araripensis* Rizzini. He characterised it as differing by the fulvo-tomentose indumentum and rough, oblong leaves. However, an examination of the type of *C. araripensis*, at RB and the isotype at PEUFR, proves that this taxon is conspecific with *C. bicolor*.

Cordia bicolor is distinguished by the paler surface of abaxial leaves, the strigillose to scabrous indumentum with the trichomes borne on the veins and veinlets which converge over and cover the veinlet-areoles, and also its fruits that are minutely

strigose with the styler scars clearly defined. *C. bicolor* is similar to *C. scabrifolia* A. DC.; both have fruits strigillose, but *C. scabrifolia* differs by its leaves drying brown and the trichomes borne on the veins and veinlets are directed towards the centre of the areoles, but never covering them, and the corolla tube shorter (2.8 – 3.2 mm long).

Cordia blanchetii A. DC. (Candolle 1845: 477). *Lithocardium blanchetii* (A. DC.) Kuntze (1891: 976). Type: Brazil, Bahia, Jacobina, 1836, *Blanchet* 2618 (holotype G-DC!; isotype P!).

DISTRIBUTION. Bahia and Minas Gerais states, Brazil.

HABITAT. *Cordia blanchetii* is known from semi-deciduous tropical forest; 150 – 650 m alt.

NOTES. Johnston (1930) did not recognise *Cordia blanchetii* A. DC. as a distinct taxon and treated it as synonym of *C. superba* Cham. However, an examination of the type specimen in G-DC and the duplicate at P, has confirmed that it should be treated as a distinct taxon.

Cordia blanchetii is characterised by its 6 to 12-flowered inflorescences, with peduncles well developed (4.5 – 6.5 cm long); calyx regularly 5-lobed with the lobes acuminate (the acumen 3 – 3.2 mm long); and the corolla lobes wrinkled and sparsely pubescent on the outer surface. *C. superba*, in turn, is characterised by the calyx irregularly 3 to 5-lobed and the corolla lobes smooth and glabrous.

Cordia blanchetii most resembles *C. aberrans* I. M. Johnst., but they can be easily distinguished from each other since the latter species has the leaves ovate and flowers apparently springing directly from the leaf axils, and the leaves of *C. blanchetii* are oblanceolate to narrowly elliptic and the flowers are borne on cymes with well-developed terminal peduncles.

Cordia ecalyculata Vell. (Velloso 1827: Tab. 149). *Gerascanthus ecalyculatus* (Vell.) Borhidi *et al.* (1988: 399). Type: *Fl. Flumin.* p. 96, Tab. 149 (1825, 1827) (lectotype, selected here).

Cordia salicifolia Cham. (Chamisso 1829: 481).

Lithocardium salicifolium (Cham.) Kuntze (1891: 977). *Gerascanthus salicifolius* (Cham.) Borhidi *et al.* (1988: 401). Type: Brazil, without locality, *Sellow* s.n. (lectotype K!, selected here; isoelectotype P!).

Cordia digyna Vell. (Velloso 1827: Tab. 153). Type: *Fl. Flumin.* p. 97, Tab. 153 (1825, 1827) (lectotype, selected here).

Cordia leptocaula Fresen. (Fresenius 1857: 14). *Lithocardium leptocaulon* (Fresen.) Kuntze (1891: 977). Type: Brazil, Rio de Janeiro, Serra do Macacu, *Pohl* s.n., Herb. Mus. Vind. 1924 (holotype W n.v.; isotypes K!).

Cordia coffeoides Warm. (Warming 1867: 4). Type: Brazil, Minas Gerais, in silvis ad Lagoa Santa, 1865, *Warming* s.n. (holotype M!; isotypes C!, US!).

Patagonula glaziovii Mez (1890: 17). *Cordia glaziovii* (Mez) Taub. (Taubert 1893: Beibl. 38: 14). *Gerascanthus glaziovii* (Mez) Borhidi *et al.* (1988: 404). Type: Brazil, *Glaziou* 13476 (lectotype K!, selected here; isoelectotypes G!, P!).

DISTRIBUTION. Brazil, Argentina and Paraguay.

NOTES. *Cordia ecalyculata*, like *C. magnoliifolia* Cham., has both surfaces of the leaves glabrous, flowers distylous and glabrous fruit. But *C. ecalyculata* has globose flowers buds and smaller and narrower leaves (5.5 – 13.0 cm long, 2.5 – 3.5 cm wide) as compared to *C. magnoliifolia* which has obovoid buds and larger leaves (18.5 – 27.5 cm long and 4.5 – 8.5 cm wide).

Cordia exaltata Lam. (Lamarck 1791: 422). *Lithocardium exaltatum* (Lam.) Kuntze (1891: 977). *Gerascanthus exaltatus* (Lam.) Borhidi *et al.* (1988: 399). Type: French Guiana, without locality, *Richard* s.n. (holotype P-LA!; isotype P!).

Cordia scabrida Mart. ex Fresen. (Fresenius 1857: 11). *Lithocardium scabridum* (Mart. ex Fresen.) Kuntze (1891: 439). *Gerascanthus scabridus* (Mart. ex Fresen.) Borhidi *et al.* (1988: 402). Type: Brazil, Pará, in silvis, *Martius* 2597 (holotype M!; isotype BR!).

Cordia exaltata var. *melanoneura* I. M. Johnst. (Johnston 1935: 30). *Cordia melanoneura* Klotzsch in M. R. Schomb. (Schomburgk 1848: 960), **nom. nud.** Type: British Guiana, without locality, *Schomburgk* 1398 (lectotype K!, selected here).

DISTRIBUTION. Venezuela, Guyana, Suriname, French Guiana, and Brazil.

NOTES. *Cordia exaltata* is distinguished by its dimorphic leaves, tubular corolla (9.8 – 12 mm long) and ball-shaped glands on the prolonged connective above the anthers. It is similar to *C. panicularis* Rudge, but the latter differs in its homomorphic leaves, smaller corolla (8.4 – 8.8 mm long) and funnel-shaped calyx.

Cordia glazioviana (Taub.) Gottschling & J. S. Mill. (Gottschling & Miller 2006: 364). *Auxemma glazioviana* Taubert (1892: 11). Type: Brazil, without precise locality, *Glaziou* 11287 (holotype: B n.v.; isotype: P!, R!).

Cordia crenatifolia Rizzini (1974: 12), **synon. nov.** Type: Brazil, Bahia, Campo Formoso, Fazenda Tiririca, *Lima* 13112 (holotype RB!).

DISTRIBUTION. Brazil and Paraguay.

HABITAT. Seasonally dry tropical forests.

NOTES. Rizzini (1974) described *Cordia crenatifolia* based on Lima 13112. We studied this specimen and found its general morphology to be similar to that of *C. glazioviana*.

***Cordia magnoliifolia* Cham.** (Chamisso 1829: 476). *Lithocardium magnoliifolium* (Cham.) Kuntze (1891: 977). *Gerascanthus magnoliifolius* (Cham.) Borhidi *et al.* (1988: 400). Type: Brazil, without locality, Sellow s.n. (lectotype; K!, selected here; isoelectotypes HAL!, P!, US!).

Cordia obliqua Vell. (Velloso 1827: Tab. 150), **nom. illegit.**, (non *C. obliqua* Willd.). *Lithocardium obliquum* Kuntze (1891: 977). Type: *Fl. Flumin.* p. 97., Tab. 150 (1825, 1827).

Cordia diospyrifolia Cham. (Chamisso 1829: 477). *Lithocardium diospyrifolium* (Cham.) Kuntze (1891: 977). Type: Brazil, Sellow s.n. (lectotype HAL!, selected here; isoelectotype B† photo G!).

DISTRIBUTION. *Cordia magnoliifolia* is known only from Atlantic coast forest in Brazil.

NOTES. *Cordia magnoliifolia* was described by Chamisso (1829) based on a collection of Sellow collected in ‘Brasilia aequinoctiali’ and deposited in B. This specimen was destroyed during the Second World War, but there are duplicates in the K, P and US. We named the duplicate deposited in K as lectotype of this taxon because it is in good condition and fits the protologue description. There is a photo in G of the type material from B, which was also useful for the delimitation of the taxon.

Cordia magnoliifolia is distinctive in its large, oblanceolate and glabrous leaves. It is close to *C. ecalyculata* which has leaves glabrous on both surfaces, flowers distylous, and glabrous fruits. However, *C. ecalyculata* has globose flower buds and smaller leaves (5.5 – 13.0 cm long) and *C. magnoliifolia* has obovoid flowers buds and larger leaves (18.5 – 27.5 cm long).

***Cordia sellowiana* Cham.** (Chamisso 1829: 478). *Lithocardium sellowianum* (Cham.) Kuntze (1891: 977). *Gerascanthus sellowianus* (Cham.) Borhidi *et al.* (1988: 402). Type: Brazil, without locality, Sellow s.n. (lectotype: G!, selected here).

Cordia obscura Cham. var. *tomentosa* Cham. (Chamisso 1833: 128). Type: Brazil, without locality, Sellow s.n. (lectotype G!, selected here; isoelectotype HAL photo!, P!).

Cordia brachypoda A. DC. (Candolle 1845: 487). *Lithocardium brachypodum* (A. DC.) Kuntze (1891: 976). *Gerascanthus brachypodus* (A. DC.) Borhidi *et al.* (1988: 399). Type: Brazil, Bahia, 1832, Blanchet 648 (holotype G-DC!).

Cordia obscura Cham. var. *magnifolia* Fresen. (Fresenius 1857: 15). Type: Brazil, Minas Gerais, near Serra da Caraça, Martius 1119 (lectotype M!, selected here; isoelectotypes M!).

DISTRIBUTION. *Cordia sellowiana* is known only from Brazil, in the Alagoas, Bahia, Ceará, Distrito Federal, Mato Grosso, Paraíba, Pernambuco, Distrito Federal, Goiás, Rio de Janeiro, and São Paulo states.

HABITAT. It occurs in lowland and submontane forest, sometimes in montane forest, semi-deciduous forest and gallery forest; 100 – 1100 m alt.

NOTES. *Cordia sellowiana* is variable in pubescence. For this reason, there have been several names for this taxon. The taxa *C. sellowiana*, *C. obscura* var. *tomentosa* and *C. brachypoda* are copiously pubescent with spreading hairs and clear tomentum on the abaxial leaf surface. Meanwhile, *C. obscura* has sparse pubescence, appearing glabrous. The latter species was described by Chamisso (1829) based on Sellow’s material deposited in B, which was destroyed during the Second World War.

Fresenius (1857) did not indicate a holotype when he described *Cordia obscura* var. *magnifolia*. He mentioned two syntypes, both with the same number (Martius 1119) but collected in Minas Gerais with different localities: (1) in montibus inter Ouro Preto et oppidum Praesidio de S. João Bapt. and (2) near Serra da Caraça, both deposited in M.

Cordia sellowiana is easy to recognise by its homomorphic leaves with the adaxial surface strigose and abaxial surface tomentose, calyx at anthesis opening regularly into 5 lobes and glabrous fruit. This species can be confused with *C. toqueve* Aubl., which has similar foliage, but *C. toqueve* has dimorphic leaves and pubescent fruit.

***Cordia silvestris* Fresen.** (Fresenius 1857: 12). *Lithocardium silvestre* (Fresen.) Kuntze (1891: 976). Type: Brazil, Rio de Janeiro, silvis a campinho usque in Serram, 1500 ped., Dec., Martius 299 (lectotype M!, selected here).

DISTRIBUTION. Known only from Brazil, in Minas Gerais, Paraná, Rio de Janeiro, Rio Grande do Sul, and Santa Catarina.

NOTES. *Cordia silvestris* is easily recognised by its obovate or oblanceolate leaves (5.8 – 13.4 cm long) with a glabrous adaxial surface and a calyx which is pyriform in bud opening regularly into 5 lobes. It closely resembles *C. ecalyculata* which has the elliptic to elliptic-lanceolate leaves and a globose calyx opening irregularly into 3 or 4 lobes.

Martius 299 was designated as lectotype. The other syntype Schott s.n., *Herb. Vindob.* 4949 should be in W, but we had difficulties in obtaining loans or photos of it.

Cordia ucayaliensis (I. M. Johnst.) I. M. Johnst. (Johnston 1935: 181). *Cordia ulei* I. M. Johnst. var. *ucayaliensis* I. M. Johnst. (Johnston 1930: 57). *Gerascanthus ucayaliensis* (I. M. Johnst.) Borhidi *et al.* (1988: 403). Type: Peru, Loreto, Yarina Cochas, Tessmann 5457 (lectotype NY!, selected here; isoelectotypes GH!).

DISTRIBUTION. Brazil and Peru.

NOTES. *Cordia ucayaliensis* is characterised by leaves elliptic and strigose on both surfaces, and glabrous fruits. It resembles *C. ulei* I. M. Johnst., since both have glands on the anthers and glabrous fruits, but the corolla tube is shorter in *C. ucayaliensis* (4.5 – 5.2 mm long).

Cordia ulei I. M. Johnst. (Johnston 1930: 56). *Gerascanthus ulei* (I. M. Johnst.) Borhidi *et al.* (1988: 403). Type: Brazil, Acre, Rio Acre, Seringal São Francisco, March 1911, *Ule* 9716 (lectotype K! selected here; isoelectotypes G!).

DISTRIBUTION. Known only from Brazil, occurring in Acre, Amazonas, Pará, and Rondônia states.

NOTES. *Cordia ulei* is characterised by obovate-elliptic or oblong-lanceolate leaves and glabrous ovary and fruits. The leaves are broadest above the middle and larger, like those of *C. sellowiana*, but in *C. ulei* the adaxial surface of the leaves are glabrous except along the midrib and the principal nerves, whereas in *C. sellowiana* the adaxial surface of the foliage is always pubescent. *C. ulei* resembles *C. exaltata*, however the latter has a larger corolla (9.8 – 12 mm long) and bears glands on the anthers.

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